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NIH Researchers Testify in Congress

Tale of the Fraud Study That's Too Hot to Publish

This is the story of a study that two career scientists at the National Institutes of Health conducted on scientific "misconduct," sometimes referred to as fraud. Highly praised by many reviewers for mainstream scientific journals, though knocked by some, the study has gone unpublished for two and a half years amid formal threats of libel suits if it ever sees the light of day.

Some parts of this ugly tale of editorial suppression have finally become public—but not in a scientific forum. Rather, the two NIH scientists, Ned Feder and Walter W. Stewart, testified under oath on February 26 before the House Judiciary Subcommittee on Civil and Constitutional Rights, which is investigating the "chilling effect" of libel threats on editors' willingness to publish controversial material.

In their Congressional testimony, both came across as undramatic, cautious, and credible witnesses (See p. 4 for verbatim extracts). The Congressmen who heard them were visibly sympathetic. Feder has been at NIH since 1955, except for 1961-67, when he was in the biology department at Harvard; Stewart has been at NIH since 1968. Both are researchers at the National Institute of Arthritis, Diabetes and Digestive and Kidney Diseases.

NSF Survey Finds Upswing in Hirings Of Foreign Scientists, Engineers—Page 8

The threats of libel suits if publication occurs came from lawyers engaged by several established researchers who emerged unscathed from the notorious Darsee affair, in which a junior faculty member at Harvard Medical School confessed in 1981 to falsifying research that went into numerous co-authored publications. In all, John R. Darsee was co-author of 18 major scientific papers and some 100 abstracts, reviews, notes, and other publications. Listed as co-authors of these publications was a total of 47 scientists at Harvard and at the Emory University School of Medicine, where Darsee was previously employed.

Once regarded as one of the brightest and most prolific young investigators in cardiac research, Darsee has been defrocked and has dropped from public view. At the time of his fall, the *New York Times* reported that "The doctor supervising his research, Eugene Brawnwald [Chairman of the Department of Medicine at Brigham and Women's Hospital, where Darsee worked] ordered that all abstracts of Darsee's work be withdrawn from the annual meeting of the American Heart Association."

In a prepared statement routinely requested of Congressional witnesses, Feder and Stewart explained that, having "long been interested in the professional practices of scientists," they decided to study Darsee's co-authored papers and the large amount of data that had been produced by Harvard's and NIH's investigations of the Darsee case. Their statement, which was submitted to and cleared by the NIH administration, stressed

(Continued on page 3)

In Brief

Aiming where it hurts (and is bound to evoke the gravest alarm), NSF Director Erich Bloch has warned university heads that "If the President's budget is not passed," Gramm-Rudman could force NSF to consider a number of drastic moves "such as elimination of Principal Investigator salary support; limits on indirect cost rates . . . and larger cost-sharing requirements." Bloch didn't tell his clients to barrage their Congressmen—which he's not allowed to do—but simply concluded with, "It is therefore prudent to bring these possibilities to your attention at this time."

But the American Physical Society is urging its members to tell Congress about "the need to invest in scientific research—a need that is even greater in times of economic stress." In a message to members, APS President Sidney Drell advised lobbying Congress to "stress the value of science rather than of particular projects. The priorities of science are best argued through the merit review process," he said in an obvious reference to the gusher of R&D pork-barrel projects approved last year on Capitol Hill.

The House is yet to act, but the Senate has named its members for the newly established Congressional Bioethics Board: Democrats Gore (Tenn.), Kennedy (Mass.), and Bumpers (Ark.); Republicans Weicker (Conn.), Humphrey (NH), and Durenberger (Minn.). The Board, which will preside over a 15-member Commission of specialists, is a spiritual descendant of the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavorial Research, which expired in 1983.

Praise Mixed with Forebodings of Libel Suits

Forty-eight typed pages plus references and tables in its latest version, the Feder-Stewart paper is blandly titled "Professional Practices Among Biomedical Scientists: A Study of a Sample Generated by an Unusual Event." The paper has generated a substantial volume of correspondence and commentary, from which the following items have been culled:

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Daniel E. Koshland, editor,* Science, *February 8, 1985, to Feder and Stewart: " . . . grateful to you for sending this intriguing manuscript . . . As you pointed out in your cover letter, the implications are made more credible by the total documentation." But, citing space limitations and *Science's* past coverage of Darsee's exposure and disgrace, Koshland rejected the paper. In July, responding to a revised version, Koshland wrote: "I do not concur with you that the details of this case are important or that they will affect public policy on fraud."

Michelle Press, editor,* American Scientist, *September 6, 1985, to Stewart: "Both our publisher and longtime legal advisor believe that the legal costs involved would be prohibitive . . . . It has been sobering to look at your and Dr. Feder's clear and convincing report."

Professor Thomas P. Stossel, Harvard Medical School, editor,* Journal of Clinical Investigations, *August 30, 1985, to Arnold Relman, editor,* The New England Journal of Medicine (NEJM), *which had rejected the paper in July: " . . . . I agreed to look at [Stewart's] material, including the voluminous correspondence with editors and (to me) rather chilling emanations from lawyers. I found the paper to be overstated, woolly, and excessively judgmental and moralistic. I also appreciated it is one thing to do an analysis of the dead or defrocked and another to do one on the living and litigious. On the other hand, the paper does contain some disturbing and in my opinion unassailable points.

"I am further disturbed by the trail of events that this paper has elicited, namely to be strung along by several prominent journals and finally shut off because of the legal pressures brought to bear . . . . On the one hand, the scientific communication system does not come off looking very good. On the other hand, this story will come back to haunt us one way or another . . . . Finally I am terribly disturbed about publication practices being directed by attorneys."

Stossel added that his own journal "is simply not the place to publish such stuff," and asked Relman "to help them recast the material in a way that it could be published" in Relman's journal. Relman replied that though the NEJM had published two of Darsee's papers, and then retracted them, "I don't feel that this obligated us to publish the whole, huge amorphous mass of material they sent me, which largely dealt with the transgressions of others." Relman then suggested that Stossel help Feder and Stewart to condense the paper for submission to the NEJM; nothing came of that suggestion.

The correspondence from lawyers for two scientists included in the Feder-Stewart study resounded with ominous terminology:

April 10, 1984, to *Nature*. "The proposed article is clearly defamatory to my client and if published will cause irreparable and serious damage to his professional reputation . . . . The publication of this article in its present form is malicious defamation and will be treated as such . . . . This letter is notice to you and shall constitute such."

June 1, 1984, to Feder and Stewart. "This one-sided distortion is in contravention of your legal obligations pursuant to the common law of libel and defamation . . . . "

August 7, 1984, to the Legal Advisor, NIH. "As that paper is now written, NIH approval cannot be granted, for NIH Manual Chapter 1184 precludes approval of a paper, like Stewart and Feder's, which violates the law, including the law of libel."

May 3, 1985, to the Director of NIH. ". . . I am requesting that the relevant background correspondence and memoranda we have submitted relating to the draft paper be provided to all journals to which the draft paper has already been submitted . . . . "

September 18, 1985, to the editor of *Cell*. "If the article is published in its present form, it will cause irreparable and serious damage to [my client's] reputation, and will be published by you with actual malice."

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. . . Editors' Enthusiasm Wilts Under Legal Warnings

(Continued from page 1)
that they didn't know any of the people involved and that their own work, in genetic control of nerve cell shape, was remote from Darsee's.

The Feder-Stewart statement continued: "The idea was to study a particular group of 47 biomedical scientists about whose professional practices an unusual amount of published information was available. The members of this group had been co-authors of one particular scientist who, unknown to his co-authors, had forged much of the data on which their publications were based . . . . The public reports of the committees that investigated the forgery contained much information about the co-authors: their private research practices were described in the reports, often in detail."

Interest Expressed by "Nature"

"We described the idea to the editor of *Nature,*" the statement went on, "and he expressed interest in publishing such a study."

Commencing what they thought would be a relatively brief departure from their laboratory duties—with which they continued while researching and writing the paper—they assembled the Darsee materials. Their focus was not the data falsified by Darsee, which presumably was unknown to his co-authors. Rather, it was visibly suspect items in the co-authored papers which a trained scientific eye could be expected to recognize as faulty or questionable. (The kindest implication, of course, is that the mandarins signed without reading—a practice not unknown in the senior-junior relations of science.)

"We found," Feder and Stewart reported in their Congressional statement, "that more than half the scientists in our sample (35 out of 47) had engaged in questionable practices. Some practices were minor, due to haste or carelessness—for example, failure to exercise sufficient care in eliminating errors from research about to be published.

"There was also some fairly serious misconduct, including the publication by several scientists of statements for which the evidence indicates that they knew or should have known of their falsity. About one-fourth of our sample, according to our analysis, engaged at least once in the more serious type of conduct. The reported results of the scientists' published research were in some instances weakened or invalidated by the effects of their misconduct."

None of Darsee's co-authors was identified by name in the paper by Feder and Stewart, but, as their statement to the Subcommittee pointed out, "a reader could deduce their identities by studying the published documents on which our report was based."

In September 1983, the completed paper was submitted to *Nature,* whose editor, John Maddox, wrote to Feder and Stewart: "This, first of all, is . . . to reaffirm that we shall publish it in some mutually acceptable form, in the light of opinion from lawyers and referees. I think that what you have done is an important public service . . . . "

In March 1984, with Feder's and Stewart's approval, Maddox sent draft copies of the paper to 18 persons, including some of Darsee's co-authors. Among the 12 responses that came back, the two NIH researchers told the Subcommittee, "Only three scientists alleged specific factual inaccuracies in our description of misconduct. We corrected the few statements that we considered inaccurate."

The two authors were confident that publication in *Nature* would soon follow. Instead, they were confronted by legal threats and other steps to prevent publication. As described in the Feder-Stewart Congressional statement:

"Two of the scientists hired lawyers who, over the next 18 months, threatened *Nature* and ourselves with libel suits if our report were published. Up to now, the lawyers have produced more than 20 letters and memoranda containing up to a total of about 150 typed pages . . . .

Lawyers Warn NIH Officials

"In addition to writing letters, the lawyers made phone calls to the editor of *Nature* and to officials at NIH. One of the lawyers had a personal conference with the editor. Another lawyer (from a large Washington law firm) conferred at NIH with the Director of NIH."

Nature's Maddox, the statement continued, requested numerous revisions, pointing out that, in Feder's and Stewart's words, "English libel law is stricter than US law." In August 1984, eleven months and several rewrites after completion of the original draft, a publication date was actually set, but after repeated postponements, Feder and Stewart withdrew the paper in February 1985 and sought publication elsewhere.

Determined to stick with refereed journals, they turned to *Cell,* then published by the MIT Press. They informed the editor, Benjamin Lewin, of the paper's troubled history, and he "seemed undaunted by the threats of a libel suit and enthusiastic about the prospect of publishing our report," Feder and Stewart reported.

Feder and Stewart nonetheless encountered some hesitation on Lewin's part: "However, he cautioned us that before making a commitment, he must hear from his lawyers and from those with responsibility for the publication, namely MIT Press . . . "

Lewin soon had serious second thoughts. He wrote to Feder and Stewart that "even if the majority of scientists

(Continued on page 4)

Verbatim from the Hearing on Suppressed Paper

The following is from the hearing on "Current American Libel Law and Alternatives," held February 26 by the House Judiciary Subcommittee on Civil and Constitutional Rights. The Subcommittee, chaired by Rep. Don Edwards (D-Calif.), heard several witnesses, including Ned Feder and Walter W. Stewart, both of NIH, on whose testimony we focus.

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Rep. Charles E. Schumer (D-NY). Describe to us a little bit about the [scientific] misconduct [that you examined].

Stewart. . . . . We found it was not uncommon for scientists, particularly senior scientists, to put their names on publications that they didn't know much about. In some instances, they knew nothing about it, except that their name was on it. We found that this was a somewhat accepted practice, and that there are senior scientists who will get up and defend this practice as being a very good thing in some sense.

But we argue that it is very difficult—in fact, impossible—for a person to take responsibility for something they haven't had something to do with. And that it doesn't help the process of scientific verification to have people's names appearing on papers if they don't know anything about the paper . . . .

Rep. Don Edwards (D-Calif.) Could you go to a book or an encyclopedia or an established work on a particular subject and show that what they said is white is really black or something like that?

Stewart. That would go to the accuracy of the scientific paper. We've all had experience—you try to avoid it if you possibly can—with publishing something that later turns out not to be true. It is through an error or a mistaken interpretation. But we didn't count anything like that at all . . . . But, as we became more familiar with the sort of objections that might be raised in court, and with the difficulty of proving a state of mind that occurred 4 or 5 years ago, we took the statement simply that they either knew or should have known. But to a layman, the evidence shows that they knew the statement was wrong. So they were putting their name on something that they knew or should have known was not true. And that's much more dramatic than simply publishing something that's inaccurate.

Rep. Edwards. You have important material that should be made available to the readers but it's not being made available.

Rep. Schumer. You feel this is a cause already. Obviously, the time and effort you've put into this—you have your jobs at NIH—it's become sort of a major cause for you to get this work published, to prove that the system can work. Is that a pretty accurate way to put it?

Stewart. I think that's fair.

Feder. We started work on this idea initially because we felt we had an unusual and very good idea for finding out something that nobody knew anything about, about which there was a lot of speculation. People speculate, on the one hand, that misconduct is rare among scientists and, on the other hand, that it's common. We thought we saw a way of beginning

(Continued on page 5)

Misconduct Report *(Continued from page 3)*

may consider that a practice is unacceptable, it is not clear to me that the lawyers will necessarily share that view. I think we therefore have to pay attention to the legal advice, even though we may be convinced that the article is justifiable on factual grounds." Lewin added that "I have been somewhat disheartened by the legal advice . . . . I am not sure that these points can be documented in a way that is simultaneously satisfactory legally and to the reader."

Feder and Stewart reported that they agreed to most of Lewin's requests for "an expanding series of changes," but by June 1985, they were pessimistic about acceptance by *Cell*. Hope revived briefly when "The editor later made it a condition of publication that we promise in advance to indemnify him, all other employes of *Cell*, and MIT Press and its employes for any legal costs and liabilities if there were a lawsuit.

"We argued against this for about a week, but then we signed. At this point the editor said that if our report were published, certain discussions by us with journalists or others might precipitate a lawsuit. He therefore made it a further condition of publication that we agree in writing not to discuss in any way the process of editorial review at *Cell* and not to talk with journalists or others except under certain constraints." Feder and Stewart refused to accept the terms. In November 1985, *Cell* turned down the paper. Among the author's souvenirs is a letter from Lewin stating that "The consensus of opinion has been that it would be overwhelmingly in the public interest for this article to be published."

Feder and Stewart then sent informal inquiries to 14 refereed journals. "We told the editor that, if on considering the difficulties and on reading our report, he thought that acceptance for publication was reasonably likely, then we would make a formal submission. Although more than half the editors commented favorably on our report, there was not a single journal for which publication appeared at all likely."

At last report, the paper is again under serious consideration by *Nature*. —DSG

. . . Editors Didn't Contest Accuracy of Fraud Study

(Continued from page 4)

to open the door to that question.

We put in a relatively small amount of work into reaching what we thought was the answer after a year. And we still think it's important and think it ought to be published so that the scientific community as a whole can discuss it.

Rep. Schumer. And if it were to be published and become known, it would cause quite a few shock waves throughout the scientific community—is that speculatively accurate?

Feder. That's possible, or likely—judging from the comments we've gotten.

Rep. Schumer. It certainly throws into great question the whole method of scientific research, at least in a percentage of the articles published. Is that fair?

Stewart. In a percentage. We would all like to think the system works well most of the time, and it certainly works some of the time, because science makes progress. We're raising the question of what that fraction is. I think that's an important question in a variety of ways. It may rub some people the wrong way, and stimulate a lot of discussion.

Feared Cost of Litigation

Rep. Schumer. What were the publishers most afraid of that caused them to turn you down? Was is the cost of defending against a libel suit or a potential damage judgment against it—that they might actually find that your stuff was libelous?

Feder. The editors did go to some trouble to determine the accuracy of our report. They had it refereed. In fact, I think it was more heavily refereed than most papers are.

I think that, judging from their comments, they were satisfied as to the truth of what we were saying. As we pointed out, it's not clear how courts will act, but it appeared to us from their comments that they were more concerned about the cost of litigation than they were about damages in the end. And at least one editor spoke a good deal about the amount of time that he would have to spend taken away from other things that he's interested in doing, if there were a lawsuit.

Rep. Schumer. So, the wear and tear actually of a potential lawsuit, regardless of the outcome, seemed to be of great concern to at least one publisher and perhaps more. What would have changed the situation? What did the publishers ask for in order to publish your study? Did they say, if you took this out, took that out, that kind of thing?

Stewart. We came to the conclusion pretty quickly that we would do anything to get our main points published, and if we had to get rid of half of our main points or indeed in certain cases nine-tenths of them—we think it's more important to get something out on the subject and get people beginning to talk about it . . . . We would make any changes that anyone wanted, so long as the resulting article was accurate.

For example, we even proposed to remove the 2 people who had hired lawyers—remove them entirely from the study, and simply say we studied 47 scientists but we will discuss 45.

"Quaking in Their Boots"

Rep. Schumer. It seems from how you describe it, publishers are quaking in their boots about libel suits.

Feder. I think that's fair. You asked, what's on their minds? We really don't know what's on their minds, but based on the fact that they continually bring up libel, I do believe it really is on their minds.

Rep. Schumer. Do you know of other instances, in an everyday sense, where a scientist has said that the work done by Smith a year ago is wrong. That obviously happens in science or it should all the time. Any suits that you're aware of that would chill?

Stewart. Quite a few. As we started bugging people and showing our article to distinguished scientists, one out of 10, certainly, had had direct experience with a person who had forged data, in his belief, in his own laboratory. And we found many cases where people felt unable to do anything about it on account of the laws, the legal risk it would open them up to. So, we found that the subject was very much on everyone's mind, and people felt they couldn't say anything.

Feder. And so they did nothing.

Rep. Schumer. Not just in your area.

Feder. That's right. These scientists who were strongly suspected of having committed misconduct in the lab were simply allowed to leave the lab and perhaps go to other laboratories to work, because the person aware of this was afraid of being sued. . . . . I gladly emphasize that it's not our purpose to single out the individuals of this group who may have committed misconduct. We included enough—though we didn't name them—identifying information in our papers so that they could be identified . . . . There were 2 reasons for doing this. Number 1, it's customary in scientific publications to provide data. In this case, data means the information in the papers we

(Continued on page 6)

French R&D: Weighing the Shifts Election May Bring

Paris. Five years of Mitterrand-style Socialism have been beneficial for the French research enterprise, both in terms of ample budgets and some relaxation of the ancient administrative rigidities that afflicted the nation's scientific institutions. So, there is apprehension about what the future will bring under the divided government that is almost certain to result from the March 16 elections.

In odd harmony with its rightist Republican counterpart across the Atlantic, the Socialist regime here has sheltered government-funded research from various austerity moves. After a period of regular increases, research has again been scheduled for favorable treatment—up in 1987 by 6.5 percent from the $3 billion budgeted for this year in the core program of basic and applied research. In step with the spending increases under Mitterrand, priority has been given to the creation of new research jobs, of which 1300 have been added to the government's rolls. The budget increases have actually exceeded the levels set in the 1986-88 national plan for technological research and development.

The 3-year plan grew out of a nationwide series of consultations that the government initiated with the scientific community in 1982. That rather free-form process was superseded by more technocratic methods applied under the direction of the Minister of Research and Technology, Hubert Curien, and the Administration for Planning. The design that finally emerged in 1985 committed France to pursuit of the United States in the percentage of gross national product devoted to research and development—at the time, 2.25 percent for France and 2.73 for the US (with Japan at 2.47 and West Germany at 2.57). The plan budgeted a rise to 2.6 percent.

The "Curien Law" is generally considered reasonable and desirable. However, opinion differs on its realism since the goals for national R&D expenditures are based not only on government spending—which has been forthcoming—but also on industrial spending, which has been sluggish.

Attracted by the legends of success in small-scale American high-tech enterprise, the government has introduced various devices aimed at transplanting the process to France. The 20-year-old National Agency for the Valorization of Research (ANVAR)—akin to the US Small Business Administration in bankrolling R&D—became a major tool for the realization of Mitterrand's slogan: the modernization of industry through R&D. Starting in 1983, both its funds and visibility were greatly increased.

Envious of SDI Spending

However, the large enterprises in high-tech industry have been generally disdainful of these efforts to propagate small-fry. And, facing difficult times in domestic and world markets, they have also been cautious in making the massive R&D investments that are called for in the 3-year plan. To some extent, they have cooperated with the formula of modernization via R&D. These efforts have involved pioneering cooperative arrangements with government research organizations, especially those of the National Center for Scientific Research (CNRS), which had traditionally been aloof from direct ties to industry.

Nevertheless, it is with envy and bitterness that industrial researchers observe the formidable investments that German industry is making in R&D while, at the same time, American high-tech firms are receiving the manna of the Strategic Defense Initiative. The R&D scene is changing in France in response to bigger budgets and government efforts to stimulate industry, but the pace has picked up in other nations, too, leaving France to wonder whether its own costly efforts are sufficient to meet world competition.

The big French programs are far from negligible, but the nation's resources are quite limited by superpower standards, which means that really big ventures must encounter the complexities of European cooperation. With a high priority assigned to space, the French government has set aside $2 billion to build a space shuttle—Hermes. Like the Ariane launch vehicle and the Columbus space station, it will of course have to be a European project, but the Germans say they are not

(Continued on page 7)

Libel Hearing *(Continued from page 5)*

were writing about, specific examples of the mistakes we found. The second reason is that this made our paper verifiable . . . .

Rep. Schumer. How will this experience affect your work in the future? Will you no longer look into this particular area of misconduct by your fellow scientists and go back to your original fields of research?

Feder. It was our hope right from the beginning to do this one single piece of research, of which we happened to get a good idea, and then return to our normal work in the laboratory.

Stewart. Yes, that's our hope. But I might add a question you didn't exactly ask. We had hoped that a lot of other people would follow our study with similar studies. I feel reasonably certain that people aren't going to want to do that.

Rep. Schumer. That's a pretty fair assumption. I thank . . . the witnesses. I think your stories are a real eye opener.

. . . Eureka Program Quickly Embraced by Industry

(Continued from page 6)

interested. Nonetheless, Mitterrand has declared that Hermes is essential for the survival of the French aerospace industry, and says that France will proceed on its own. No answer has been offered to anxious concerns about the financial effects that this massive undertaking will have on other fields of science and technology.

Given this situation, high-tech firms are showing an intense interest in the Eureka Project, Mitterrand's plan for European-wide research cooperation to match the benefits that American industry is expected to reap from Star Wars spending. Only 6 months after Mitterrand launched the idea of a new Technological Europe, the first concrete projects, spanning a wide variety of fields, were announced. Viewed against the gloomy backdrop of previous European efforts to collaborate on R&D ventures with industrial potential, the response was indeed speedy.

The difference this time was in industry, which quickly recognized that Eureka may be Europe's last chance for keeping up with the surging new-era industries of the US and Japan. In addition to that stimulus, Eureka was attractive because of its focus on industrial innovation. Past efforts, like the lingering Esprit program—designed to link industrial and academic laboratories across national boundaries—accented "pre-competitive" research. Industry has felt a bit deceived by this recipe for staying in the international race. Eureka, on the other hand, calls for using government money for stimulating high-technology in industry—with a close eye on the near-term marketplace.

Following a ministerial conference in Hanover in November, Eureka was able to announce agreement on 16 projects. The criteria for choice were sometimes vague, sometimes pragmatic, and the methods of financing was also a bit uncertain, which assures some hearty battles in the national ministries that will have to foot the bills. But the machine was started up, with some $500 million designated for a flock of activities, including microcomputers, information management, medical diagnostics, and instrumentation.

For a change, the French R&D community appears generally satisfied with the government's performance. The major high-tech firms credit the Mitterrand government with establishing Eureka as a tonic for competitiveness. The small and middle-size corporations are pleased with the tax credits for research, and the researchers in government and university laboratories have seen their budgets increase.

This placid state of affairs masks the fact that serious organizational and cultural problems still afflict the R&D enterprise here. The government research establishment remains heavy and slow in its operations and resistant to change. Attempts to dislodge old-time researchers from encrusted posts in government labs and get them into industry have made little progress. So far, only 1 percent of the staffs per year have been affected.

Government labs have always been reluctant to cut off their dead branches and to accept outside evaluation of their work. They are even more on the defensive since the government has discreetly established some measuring devices. One of the greatest French mathematicians, Laurent Schwartz, has received carte blanche to set up an audit system to evaluate academic quality. Recently, the Minister of Research and Technology and the Minister of Education decided that preference for money for research equipment would be given to laboratories that can provide evidence of international scientific renown. But these measures of quality haven't really gone into effect. In science as in other aspects of national life, many things have been on hold, pending the election.

The rising costs of research have not gone unnoticed in political circles. Minister Curien, himself a former director of CNRS, last year told that sprawling national network of research facilities and laboratories, "If you want to do more in one field, do less in others."

The opposition on the political right is ready to make cuts in CNRS, which, with its 25,000 scientists, engineers, and other staff members, absorbs some 20 percent of the government's R&D spending. "We have to break up the CNRS," proclaimed one opposition politician. He denounced it as a "conformist establishment whose structures have caused a total paralysis in a large part of the scientific community." Because of its size and prominence, CNRS draws the public fire, but similar disdain is also felt for other government research institutions, including the National Institute for Agricultural Research, the Atomic Energy Commission, and the National Center for Telecommunications.

In terms of its narrow interests—more money and a minimum of outside intervention—science has fared well under Mitterrand. Many feel that things may change a good deal after March 16.—FS

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Hiring of Foreign Scientists, Engineers Rises

Employment of foreign nationals and naturalized US citizens in the nation's science and engineering industrial work force rose from 10 percent of the total to 17 percent between 1972 and 1982, according to a new NSF report.

Based on a survey of 305 firms that account for some 75 percent of employment for scientists and engineers, the NSF survey concludes that "The Nation's reliance on immigration for staffing the S/E (science and engineering) work force has increased substantially."

The report noted that the non-citizen workers averaged higher educational credentials than their American counterparts, with 35 percent holding doctorates, compared to a national average of 12 percent in the S/E work force.

Half of the surveyed firms reported that they employ foreign scientists or engineers; employment of non-citizens averaged about 9 percent of total staffs, and employment of naturalized scientists and engineers averaged 11 percent. Employment of non-citizen scientists and engineers was reported to be most concentrated among independent research and development laboratories, with 72 percent of them listing these foreign employes in their work force. In the chemical and drug industry, the figure was 62 percent, and in electronics, 52 percent.

California's Silicon Valley was cited as an especially heavy employer of foreign-born specialists. NSF reported that "The survey found that foreign scientists and engineers were employed by two-thirds of the Silicon Valley respondents. One-third of the S/E workers hired by those respondents between June 1984 and June 1985 were foreign. The NSF report stated that "Of the firms that hire foreign scientists and engineers . . . 57 percent undertake sponsorship of people who do not have permanent resident status." Two-thirds of the firms that sponsor foreign nationals reported that they pay all the costs involved and 18 percent pay partial costs.

(The report, NSF Highlights 85-336, 4 pages, "Survey of 300 US Firms Finds One-Half Employ Foreign Scientists and Engineers," is available without charge from the Division of Science Resources Studies, National Science Foundation, Washington, DC 20550.)

NAS Creates Environment Board

A Board on Environmental Studies and Toxicology has been established by the National Academy of Sciences to study "polution sources, pathways of exposure, health effects and control techniques." Donald F. Hornig, Director of Harvard's Interdisciplinary Program in Health, will serve as Board Chairman.

Twenty-eight members of the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine have also been named to the Board. Derva L. Davis has been appointed Acting Staff Director.

House S&T Lists Publications

The House Science and Technology Committee's Subcommittee on Science, Research and Technology, Capitol Hill's most active setting for hearings and studies about federal-science relations, has issued a list of titles of some 50 reports and texts of hearings from its activities over the past 3 years. Ask for list of Hearing Records and Reports of the 98th and 99th Congresses. (Science and Technology Committee, SR&T, 2319 Rayburn Building, Washington, DC 20515; tel. 225-225-8844.)

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